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SPRAY NOZZLE FOR A PORTABLE MIST BLOWER

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It was necessary to find an easily portable mist blower for the application of DDT solutions in connection with the Japanese beetle (Popillia japonica Newm.) control program in isolated areas. Such a blower was necessary to supplement the large-capacity machines and was especially needed for the spraying of small areas, such as backyards, which could not be reached by the spray delivered by the large machines. A commercially available, electrically powered, blower-type sprayer was selected for this use. The nozzle with which it was equipped was replaced with a nozzle designed to improve spray distribution. This arrangement was used during the summer of 1948 by the Division of Japanese Beetle Control and by cooperating State agencies, and was found to perform satisfactorily. This paper describes the construction and operation of the nozzle.

Construction

The construction of the nozzle can best be described with reference to the numbered parts in figure 1.

The assembled nozzle is shown partly cut away in figure 1, A. It consists of a hollow barrel (1), the inside of which is threaded to accommodate the spray-adjusting screw (2) and the lock screw (3).

The construction of the barrel is shown in cross section in figure 1, B. It was made from a piece of cylindrical brass rod 1 1/4 inches in length and 5/8 inch in diameter. A hole 3/16 inch in diameter (4) was drilled longitudinally through the center of the rod, and the inner surface was threaded by means of a 1/4-inch-by-28 tap. The threads to a distance of 1/4 inch from one end were removed with a 1/4-inch drill, to provide for an expansion chamber (5). The outer surface of the rod was machined to 5/16 inch in diameter to a distance of 1 inch from the other end, thus forming a deflecting collar (6). The remainder of the outer surface was

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machined to form a curved surface (7), the largest diameter of which was 5/8 inch and the smallest diameter 5/16 inch. The curve was an arc of a circle having a diameter of 9/16 inch.

The construction of the adjusting screw is shown, partly cut away, in figure 1, C. It was made from a brass rod 1/2 inch in diameter and 1 1/4 inches in length. A hole having a diameter of 1/8 inch was drilled longitudinally through the center of the rod to 3/16 inch from one end to provide a tube for containing liquid (8). The outer surface of the rod was machined to 1/4 inch in diameter for the same distance to provide a deflecting surface (9) and threaded with a 1/4-inch-by-28 die. The section 1/4 inch in length adjacent to the deflecting surface (9) was then machined to 3/16 inch in diameter to provide a recess (10). Four ports (11) 1/16 inch in diameter and equally spaced were drilled into tube 8, centered 5/32 inch from the deflecting surface 9. This end of the adjusting screw was machined to form a conical section (12), a head (13), and a slot 1/16 inch wide and of the same depth (14).

The lock screw (3), shown in cross section in figure 1, C, is a section 3/16 inch in length cut from the threaded end of the adjusting screw. Both ends of the section are slotted to accommodate a screw driver.

Operation of the Nozzle

The operation of the nozzle is shown diagrammatically in figure 2. The nozzle is located in the blower-discharge tube (15) so that the deflecting collar (6) is 1/8 inch beyond the end of the tube and surrounded by the air blast indicated by arrows (16). The threaded end of the nozzle is screwed onto the end of an insecticide supply pipe (not shown). The insecticide is forced into liquid tube (8) as indicated by arrows (17). It passes through the ports (11) into the expansion chamber (5), from which it passes through the space between the end of the barrel (1) and the deflecting surface (9). A space of 0.005 inch has been used successfully. Other spaces may be obtained by regulating the positions of the spray-adjusting screw (2) and the lock screw (3). The action of the air blast causes the insecticide to travel along the curved surface (7) and to be discharged from the outer edge of the deflecting collar (6) as a mist entrained in the air blast.

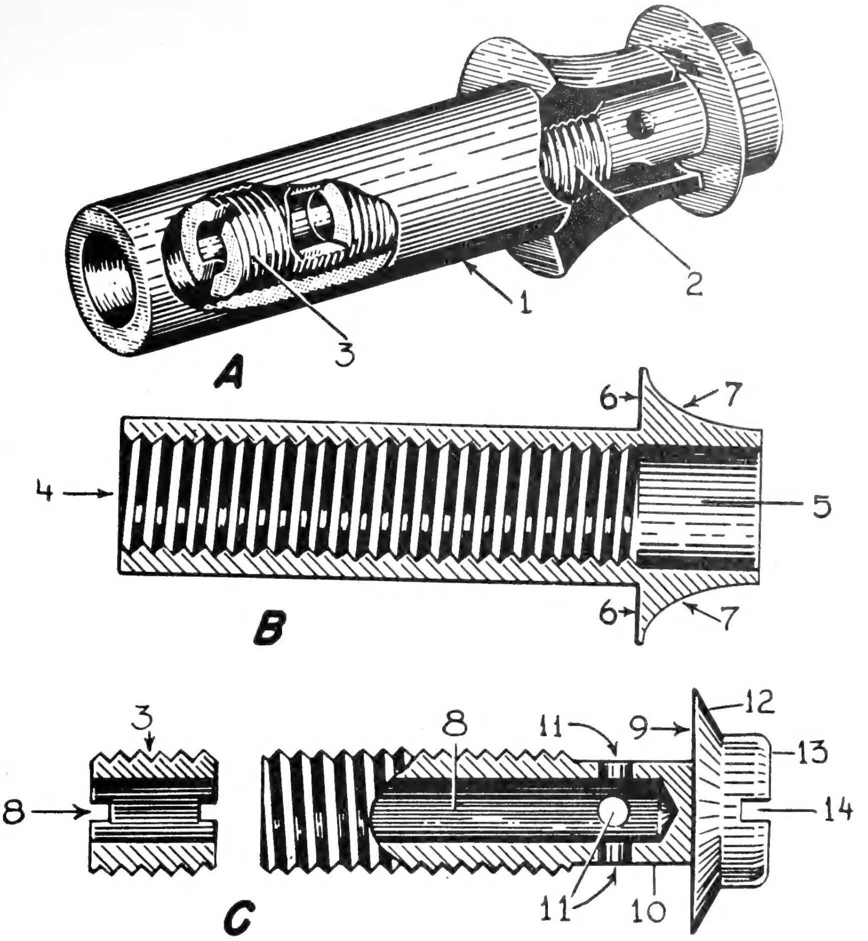

Figure 1.--Views of nozzle, showing: A, Assembled nozzle, partly cutaway; B, barrel in cross section; C, adjusting screw, partly cutaway.

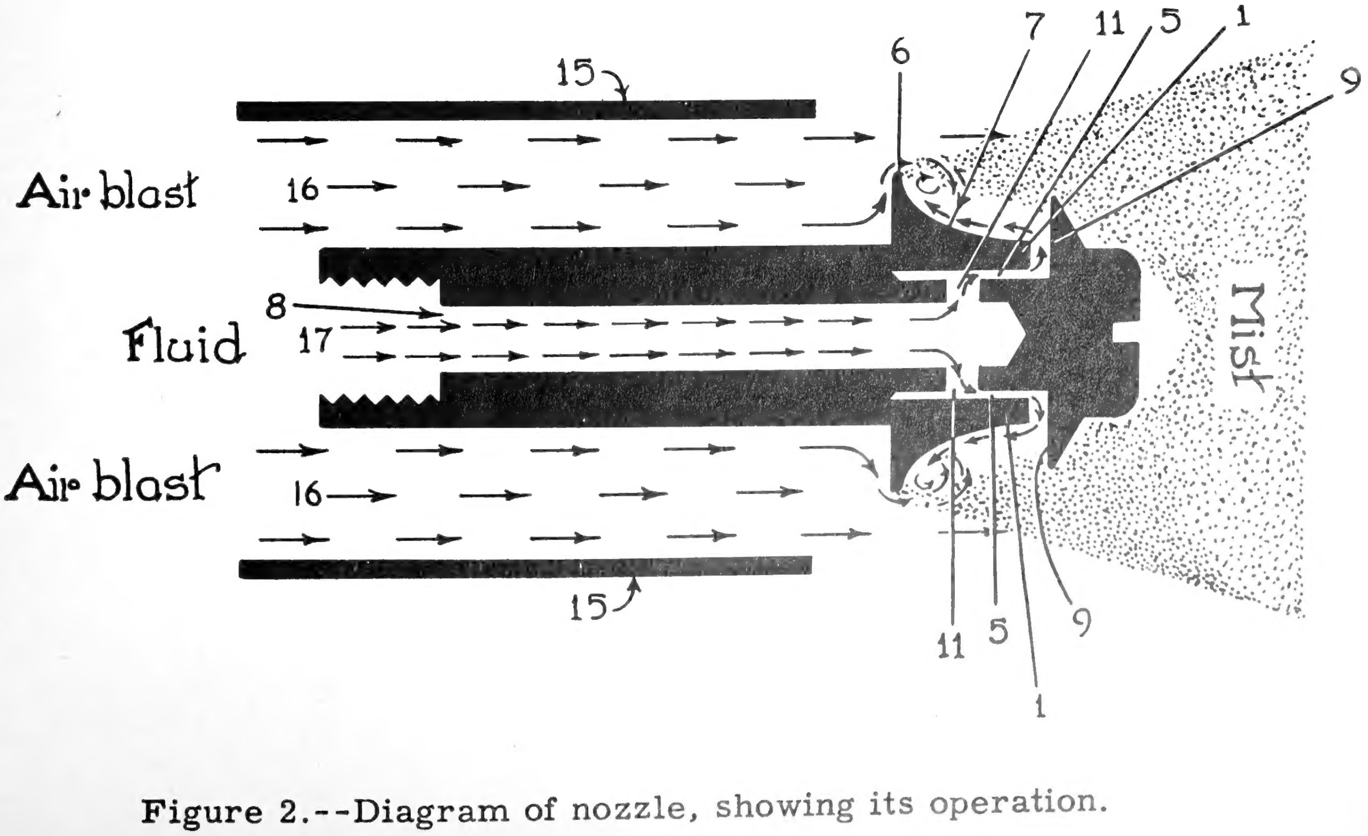

Figure 2.--Diagram of nozzle, showing its operation.